

Response to Amendment

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 21, 2009 has been entered.

Claims 1, 3, 5-9, 19, 21 and 23-27, are pending for examination; claims 1, 19 and 25 have been amended; claims 2, 4, 10-18, 20, 22 and 28-33 have been canceled.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with the attorney on record (Joseph F. Oriti) on July 29, 2009.

AMENDMENT:

To the Application received on Feb. 19, 2009 please modify the following:

1. (Currently Amended) A computer-executed method of retrieving XML data from a database, the method comprising:

creating a primary table structure to hold XML data as a binary large object in an XML column, wherein each row in the primary table comprises a primary key;

creating a primary XML index relating to the primary table structure, where the primary XML index includes a first XML path to a node table;

populating the primary table and the primary XML index, wherein the primary XML index is populated by shredding XML values stored as the binary large object in the XML column of the primary table, and wherein the XML index preserves document order and structure by duplicating a respective primary key from the primary table and combining it with an XML node identifier for each entry in each node table;

creating an alternate secondary path index in a form of (HID, HID value, PK, XID) to reduce a number of join operations for queries on the primary XML index table, wherein HID represents a hierarchical identifier, HID value represents a path efficiency, PK represents a primary key, and XID represents an XML node identifier;

querying on the primary table, which then uses the created XML path indexes by directing the query to a location identified in the XML index node table to satisfy the query, whereby XML data is retrieved from the database; and

retaining the primary table and primary XML index so that subsequent queries execute faster than an initial query.

2. (Canceled)

3. (Previously Presented) The method of claim 1, wherein the node table comprises a B⁺ tree structure.

4. (Canceled)

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5. (Original) The method of claim 1, wherein the creating a primary table structure comprises creating a structure for XML data and non-XML data.
6. (Original) The method of claim 5, wherein the querying retrieves XML and non-XML data.
7. (Original) The method of claim 1, wherein the method is performed by a database engine.
8. (Currently Amended) The method of claim 1, further comprising:
~~creating a secondary XML index relating to the primary table structure and the primary XML index;~~
populating the secondary XML index; and
querying on the primary table wherein the query utilizes the primary XML index and the secondary XML index to retrieve the XML data.
9. (Original) The method of claim 1, wherein the querying further comprises utilizing multiple path expressions in the retrieval of the XML data.
- 10-18. (Canceled)
19. (Currently Amended) A machine-readable medium having instructions therein, executable by a machine to perform a method of retrieving XML data from a database using a query, the method comprising:
creating a primary table structure to hold XML data as a binary large object in an XML column, wherein each row in the primary table comprises a primary key;
creating a primary XML index relating to the primary table structure, where the primary XML index includes a first XML path to a node table;
populating the primary table and the primary XML index, wherein the primary XML index is populated by shredding XML values stored as the binary large object in

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the XML column of the primary table, and wherein the XML index preserves document order and structure by duplicating a respective primary key from the primary table and combining it with an XML node identifier for each entry in each node table;

creating an alternate secondary path index in a form of (HID, HID value, PK, XID) to reduce a number of join operations for queries on the primary XML index table, wherein HID represents a hierarchical identifier, HID value represents a path efficiency, PK represents a primary key, and XID represents an XML node identifier;

querying on the primary table, which then uses the created XML path indexes by directing the query to a location identified in the XML index node table to satisfy the query, whereby XML data is retrieved from the database; and

retaining the primary table and primary XML index so that subsequent queries execute faster than an initial query.

20. (Canceled)

21. (Original) The machine-readable medium of claim 19, wherein the node table comprises a B⁺-tree structure.

22. (Canceled)

23. (Original) The machine-readable medium of claim 19, wherein the creating a primary table structure comprises creating a storage table for XML and non-XML data.

24. (Original) The machine readable medium of claim 19, wherein the querying retrieves XML data and non-XML data.

25. (Currently Amended) A computer system for performing queries on XML data, the system comprising:

an input device for receiving a query;

a processor for executing the query;

at least one organization of XML data;

a software structure providing an XML index of the XML data stored in a primary table as a binary large object, wherein each row in the primary table comprises a primary key, wherein nodes of the XML index are organized as a B+-tree, and wherein the XML index is populated by shredding XML values from the binary large object such that the XML index preserves document order and structure by duplicating a respective primary key from the primary table and combining it with an XML node identifier to create a first XML path for each entry in each node table; and

means to create an alternate secondary path index in a form of (HID, HID value, PK, XID) to reduce a number of join operations for queries on the primary XML index table, wherein HID represents a hierarchical identifier, HID value represents a path efficiency, PK represents a primary key, and XID represents an XML node identifier.

an application program which allows the processor to utilize the created XML path indexes as a tool for performing the query against the primary table wherein the query is executed and results of the query are returned in response to the query.

26. (Original) The system of claim 25, wherein the application program is database management system software and the processor executes the application program.

27. (Original) The system of claim 25, further comprising an output device wherein the results of the query are provided for examination.

28-33. (Canceled)

Allowable Subject Matter

Claims 1, 3, 5-9, 19, 21 and 23-27, are allowed.

The following is an examiner's statement of reasons for allowance:

Claims 1, 19 and 25, are allowable because the prior art on record or that encountered in searching for the invention, fails to disclose or suggest the features of instant invention – retrieving XML binary large object data from a database by creating an alternate secondary path index in a form of (HID, HID value, PK, XID) to reduce a number of join operations for queries on the primary XML index table, wherein HID represents a hierarchical identifier, HID value represents a path efficiency, PK represents a primary key, and XID represents an XML node identifier in a combination as claimed by applicant.

Claims 3, 5-9, 21, 23-24 and 26-27, are depend on claims 1, 19 and 25 respectively, hence, are allowable.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SUSAN Y. CHEN whose telephone number is (571)272-4016. The examiner can normally be reached on Monday - Friday from 7:00-4:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mofiz Apu can be reached on 571-272-4080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Etienne P LeRoux/
Primary Examiner, Art Unit 2161

/Susan Y Chen/
Partial Sig. Examiner
Art Unit 2161

July 30, 2009